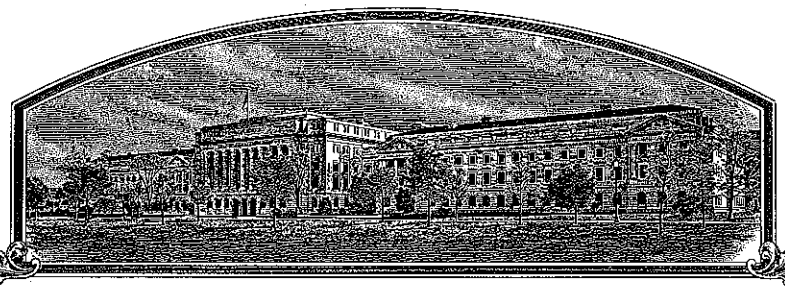

No. 200200257

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN, FIELD

'PH3RC'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this fifth day of July, in the year two thousand and six.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

☐☐REPRODUCE LOCALLY. *Include form number and date on all reproductions.* FORM APPROVED - OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY DIVISION - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
Pioneer Hi-Bred International, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER

3. VARIETY NAME
PH3RC

4. ADDRESS (*Street and No. or RFD No., City, State and Zip Code, and Country*)
7301 NW 62nd Avenue
P.O. Box 85
Johnston, IA 50131-0085

5. TELEPHONE (*include area code*)
515/270-4051

6. FAX (*Include area code*)
515/253-2125

FOR OFFICIAL USE ONLY
PVPO NUMBER
20020025

FILING DATE
Sept. 10, 2002

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION (*corporation, partnership, association, etc.*)
Corporation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION)
IOWA

9. DATE OF INCORPORATON
March 5, 1999

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION (FIRST PERSON LISTED WILL RECEIVE ALL PAPERS)

Steven R. Anderson
Research and Product Development
P.O. Box 85
Johnston, IA 50131-0085

FEES RECEIVED
FILING & EXAMINATION FEES: $ 2705.00 DATE 9/10/02
CERTIFICATION FEE: $ 768.00 DATE 4/10/06

11. TELEPHONE (*Include area code*)
515/270-4051

12. FAX (*Include area code*)
515/253-2125

13. E_MAIL
Steven.Anderson@Pioneer.com

14. CROP KIND NAME (*Common name*)
CORN

15. GENUS AND SPECIES NAME OF CROP
Zea Mays

16. FAMILY NAME (*Botanical*)
Gramineae

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ Yes ☒ No

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (*Follow instructions on reverse*)

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of the Variety
d. ☐ Exhibit D. Additional Description of the Variety (*Optional*)
e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☒ Voucher Sample (*2500 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in an approved public repository*)
g. ☒ Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" (*Mail to Plant Variety Protection Office*))

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? See Section 83(a) of the Plant Variety Protection Act)
☐ YES (If "yes", answer items 20 and 21 below) ☒ NO (If "no", go to item 22)

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☐ YES ☐ NO
IF "YES" WHICH CLASSES? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☐ NO
IF "YES" SPECIFY THE? ☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
Number 1,2,3 etc.
(if additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U.S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. (*Please use space indicated on reverse*)

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT (PLANT BREEDER'S RIGHT OR PATENT)?
☐ YES ☒ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. (*Please use space indicated on reverse.*)

24. The owner(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and results in penalties.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
		Steven R Anderson	
NAME (*Please print or type*)		NAME (*Please print or type*)	
		Steven R. Anderson	
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
		Research Scientist	8-27-2002

INSTRUCTIONS

200200257

GENERAL: To be effectively filed with the Plant Variety protection Office (PVPO), ALL of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed Exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in a approved public repository; (4) check drawn on a U.S. bank for $2705 ($320 filing fee and $2,385 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 400, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. DO NOT use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301)504-5518
FAX: (301)504-5291
Homepage: http://www.ams.usda.gov/science/pvp.htm

ITEM

18a. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified.

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:
(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens of photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

18c. Exhibit C forms are available from the PVPO for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant disease resistance, etc.

18e. Section 52(5) of the Act required applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of* certified seed), the applicant MAY NOT reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, applicant may change the choice. *(See Regulations and Rules of Practice, Section 7.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. See Section 5.5 of the Act for instructions on claiming the benefit of an earlier filing date

21. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

22. CONTINUED FROM FRONT (Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety ahs been sold, disposed of, transferred, or used in the U>S> or other countries.)

Nov. 1, 2000 Italy, Nov. 1, 2001 United States, Nov. 1, 2001 Portugal, Nov. 1, 2001 South Africa, Nov. 1, 2001 Spain

23. CONTINUED FROM FRONT (*Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).*

NOTES; It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant should check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089. http://www.ams.usda.agov/lsg/seed/ls-sd.htm

S&T-470 (06-98DESIGNED BY THE Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (03-96) which is obsolete. *(See reverse for instructions and information collection burden statement)*

2

Exhibit A. Origin and Breeding History

200200257

Pedigree: PHHB4/PHFT4)X853231141

Pioneer Line PH3RC, *Zea mays L.*, a dent-like corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross hybrid PHHB4 (Certificate No. 9400093) X PHFT4 using the pedigree method of plant breeding. Varieties PHHB4 and PHFT4 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing was practiced from the above hybrid for 11 generations using pedigree selection. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Macomb, Illinois, as well as other Pioneer research locations. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations again made for uniformity.

Variety PH4TF was derived by pedigree selection from the single cross hybrid PHG86 (Certificate No. 8700170) X PHW52 (Certificate No. 8800215).

Variety PH3RC has shown uniformity and stability for all traits as described in Exhibit C - "Objective Description of Variety". It has been self-pollinated and ear-rowed 9 generations with careful attention paid to selection criteria and uniformity of plant type to assure genetic homozygousity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity and stability, and for 6 generations during the final stages of inbred development and seed multiplication. Very high standards for genetic purity have been established morphologically using field observations and electrophoretically using sound lab molecular marker methodology.

No variant traits have been observed or are expected in PH3RC.

The criteria used in the selection of PH3RC were yield, both per se and in hybrid combinations; late season plant health, grain quality, stalk lodging resistance, and kernel size, especially important in production. Other selection criteria include: ability to germinate in adverse conditions; disease and insect resistance; pollen yield and tassel size.

Exhibit A: Developmental history for PH3RC

Season/Year Pedigree Grown	Inbreeding Level of Pedigree Grown
May/1992 PHHB4	F0
May/1992 PHFT4	F0
Oct/1992 PHHB4/PHFT4	F1
May/1993 PHHB4/PHFT4)X	F2
May/1994 PHHB4/PHFT4)X8	F3
Oct/1994 PHHB4/PHFT4)X85	F4
Jun/1995 PHHB4/PHFT4)X853	F5
Oct/1995 PHHB4/PHFT4)X8532	F6
Apr/1996 PHHB4/PHFT4)X85323	F7
Oct/1996 PHHB4/PHFT4)X853231	F8
Apr/1997 PHHB4/PHFT4)X8532311	F9
Oct/1997 PHHB4/PHFT4)X85323114	F10
Apr/1998 PHHB4/PHFT4)X853231141	F11
PHHB4/PHFT4)X853231141X	F12

*PH3RC was selfed and ear-rowed from F3 through F11 generation.
#Uniformity and stability were established from F6 through F11 generation and beyond when seed supplies were increased.

Exhibit B: Novelty Statement

Variety PH3RC mostly resembles Pioneer Hi-Bred International, Inc. proprietary inbred line PHEG9 (PVP Certificate No. 9400090). Tables 1A and 1B show two sample t-tests on data collected primarily in Johnston, Ankeny, and Dallas Center, IA. The traits collectively show measurable differences between the two varieties.

Variety PH3RC has a narrower tassel branch angle (25.1 vs 66.2) than variety PHEG9 (Table 1A, 1B). This large difference is also supported by the images in Figure 1.

PH3RC has a greater plant height (237.4 cm vs 216.7 cm) than PHEG9 (Tables 2A and 2B).
PH3RC has a higher pollen score (4.3 vs 2.8) than PHEG9.
PH3RC has a lower tassel attitude score (2.8 vs 4.0) than PHEG9.

SMS 10/31/03

Definitions:

POLSC = POLLEN SCORE.

- A 1 to 9 visual rating indicating the amount of pollen shed. The higher the score the more pollen shed.

TASSATT = TASSEL ATTITUDE

- A 1 to 5 visual rating indicating the vertical or horizontal projection of the primary tassel branches relative to the main axis. The lower the number, the more vertical the branches project. The higher the number, the more horizontal or droopy the branches project.

SMS 11/30/05

As I indicated in our last correspondence, we are submitting lab SSR molecular marker data to further support our case for distinction (see Figure 2 and Table 5 and accompanying text).

Exhibit B: Novelty Statement Tables

Table 1A: Data from Johnston, Ankeny, and Dallas Center, IA broken out by year are supporting evidence for differences between PH3RC and PHEG9. A two-sample t-test was used to compare differences between means.

TRAIT	YEAR	VARIETY-1	VARIETY-2	Count-1	Count-2	Mean-1	Mean-2	Mean_Diff	StdDeviation-1	StdDeviation-2	StdError-1	StdError-2	DF_Pooled	t-Value_Pooled	Prob_(2-tail)_Pooled
TASSEL BRANCH ANGLE (DEGREES)	1999	PH3RC	PHEG9	15	15	22.6	43.6	-21.0	11.281	17.162	2.913	4.431	28	-4.0	0.000
TASSEL BRANCH ANGLE (DEGREES)	2001	PH3RC	PHEG9	10	10	23.9	64.8	-40.9	14.004	17.819	4.428	5.635	18	-5.7	0.000
TASSEL BRANCH ANGLE (DEGREES)	2002	PH3RC	PHEG9	30	30	26.7	77.9	-51.2	13.105	25.951	2.393	4.738	58	-9.6	0.000

Exhibit B. Novelty Statement Tables

Table 1B: Summary data from Johnston, Ankeny, and Dallas Center, IA across years and environments are supporting evidence for differences between PH3RC and PHEG9. Environments had different planting dates and were in different fields. A two-sample t-test was used to compare differences between means.

TRAIT	VARIETY-1	VARIETY-2	Count-1	Count-2	Mean-1	Mean-2	Mean_Diff	Std Deviation-1	Std Deviation-2	StdError-1	StdError-2	DF_Pooled	t-Value_Pooled	Prob_(2-tail)_Pooled
TASSEL BRANCH ANGLE (DEGREES)	PH3RC	PHEG9	55	55	25.1	66.2	-41.1	12.701	26.632	1.713	3.591	108	-10.3	0.000

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Exhibit B: Novelty Statement Tables

Table 2A: Data from Johnston, Ankeny, and Dallas Center, IA broken out by year and across environments are supporting evidence for differences between PH3RC and PHEG9. Each year varieties were grown in 3 locations that had different environmental conditions. Environments had different planting dates and were in different fields. A two-sample t-test was used to compare differences between means.

TRAIT	YEAR	VARIETY-1	VARIETY-2	Count-1	Count-2	Mean-1	Mean-2	Mean_Diff	StdDeviation-1	StdDeviation-2	StdError-1	StdError-2	DF_Pooled	t-Value_Pooled	Prob_(2-tail)_Pooled
PLTHT	1999	PH3RC	PHEG9	15	15	222.2	211.5	10.7	15.368	7.652	3.968	1.976	28	2.4	0.023
PLTHT	2001	PH3RC	PHEG9	15	15	232.7	215.7	16.9	12.093	10.443	3.122	2.696	28	4.1	0.000
PLTHT	2002	PH3RC	PHEG9	15	15	254.9	222.7	32.2	8.811	13.962	2.275	3.605	28	7.6	0.000

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Exhibit B. Novelty Statement Tables

Table 2B: Summary data from Johnston, Ankeny, and Dallas Center, IA across years and environments are supporting evidence for differences between PH3RC and PHEG9. Environments had different planting dates and were in different fields. A two-sample t-test was used to compare differences between means.

TRAIT	VARIETY-1	VARIETY-2	Count-1	Count-2	Mean-1	Mean-2	Mean_Diff	StdDeviation-1	StdDeviation-2	StdError-1	StdError-2	DF_Pooled	t-Value_Pooled	Prob (2-tail)_Pooled
LTHT	PH3RC	PHEG9	45	45	237.4	216.7	20.8	16.650	11.712	2.150	1.746	103	7.1	0.000

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Exhibit B. Novelty Statement Figures

Figure 1: Images support differences in tassel branch angle between PH3RC and PHEG9.

PH3RC

PHEG9

As I indicated in our last correspondence, we are submitting lab SSR molecular marker data to further support our case for distinction. By looking at SSR marker data we can distinguish differences in genotype. Scoring of marker genotype is based on the size of the amplified fragment, which may be measured by the number of base pairs of the fragment. While variation in the primer used or in laboratory procedures can affect the number of base pairs reported, relative values should remain constant regardless of the specific primer or laboratory used. When comparing lines it is preferable if all SSR profiles are performed in the same lab. The SSR analyses reported herein were conducted in-house at Pioneer Hi-Bred.

A standard set of SSR markers were used to genetically profile the inbreds PH3RC and PHEG9. The genetic profile data showed that a genetically distinct segment of the genome on chromosome 3 was inherited from different germplasm sources. The segment was over 299 cM long (approximately 1/3 of the chromosome) on the published IBM2 Neighbors map (Figure 2). Composite public physical maps can be found at (http://www.maizegdb.org/). The public polymorphic markers that define this distinct segment are listed (Table 5). For PH3RC the segment was inherited from a source other than PHEG9 and the alleles are genetically different. This particular segment includes at least 39 publicly listed genes indicating that this chromosome segment is of functional significance. However, this segment undoubtedly contains many other genes, as the maize genome has recently been reported to contain over 59,000 functional genes (http://www.eurekalert.org/pub_releases/2004-10/rtsu-rro101204.php). The total map distance for the IBM2 Neighbors map is 7444 cM. If maize genes were randomly distributed, this would result in approximately 8 genes per cM, and 2392 genes in this 299 cM segment.

Table 5. SSR marker data for variety PH3RC and PHEG9 on chromosome 3.

Public Marker	Chromosome Number	Position IBM2 Neighbors	PH3RC base pairs	PHEG9 base pairs
PHI029 (tpi4)	3	192	158	147
BNLG1951	3	482	131	121
BNLG1160	3	491	220	222

Chromosome 3 comparison of PH3RC and PHEG9

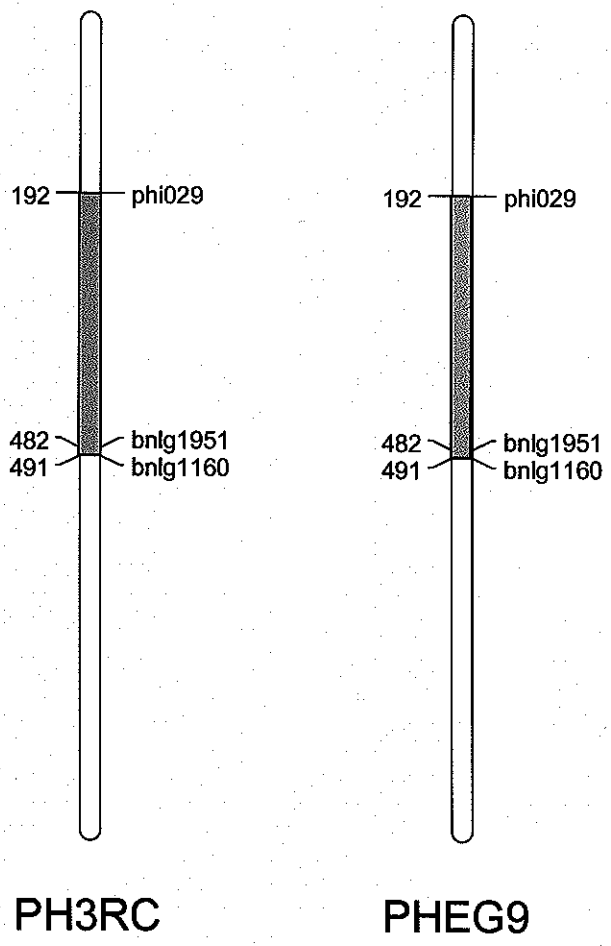

Figure 2. A polymorphic recombination segment on chromosome 3 shows a clear genetic difference between PH3RC and the most similar line PHEG9.

Answers to PVPO QA questions for DNA fingerprinting evidence:

(1) The experimental design or procedures followed are published and cited.

Primers used for the SSRs reported are publicly available and may be found in the Maize GDB using the World Wide Web prefix followed by maizegdb.org (maintained by the USDA Agricultural Research Service), in Sharopova et al. (Plant Mol. Biol. 48(5-6):463-481), Lee et al. (Plant Mol. Biol. 48(5-6); 453-461), (http://www.maizegdb.org/).

The primers for these specific markers are listed:
BNLG1951 http://www.maizegdb.org/cgi-bin/displaylocusrecord.cgi?id=145037
BNLG1160 http://www.maizegdb.org/cgi-bin/displaylocusrecord.cgi?id=144826
PHI029 http://www.maizegdb.org/cgi-bin/displaylocusrecord.cgi?id=12683

(2) The experimental design or procedures (or portions there of) can not be confidential.

The Peer reviewed methodology for SSR loci as molecular markers is cited below from this publication:
Smith et al (1997) An evaluation of the utility of SSR loci as molecular markers in maize (Zea mays L.): comparisons with data from RFLPs and pedigree. Theor Appl Genet 95: 163-173

(3) The specific differentiating bands are cited.

3. Please refer to Table 5 and Figure 2

(4) Photographic copies [of gels or other results] of scientific publishable quality with sufficient resolution and labeling to resolve the individual bands in question are provided;

4. We have included an example of the differentiating bands from the electropherogram for marker BNLG1951 (Figure 3).

(5) The procedure is well established and currently acceptable, or if novel, the results are from at least two independent laboratories with the experimental design appearing reliable.

5. See 1 and 2 above.

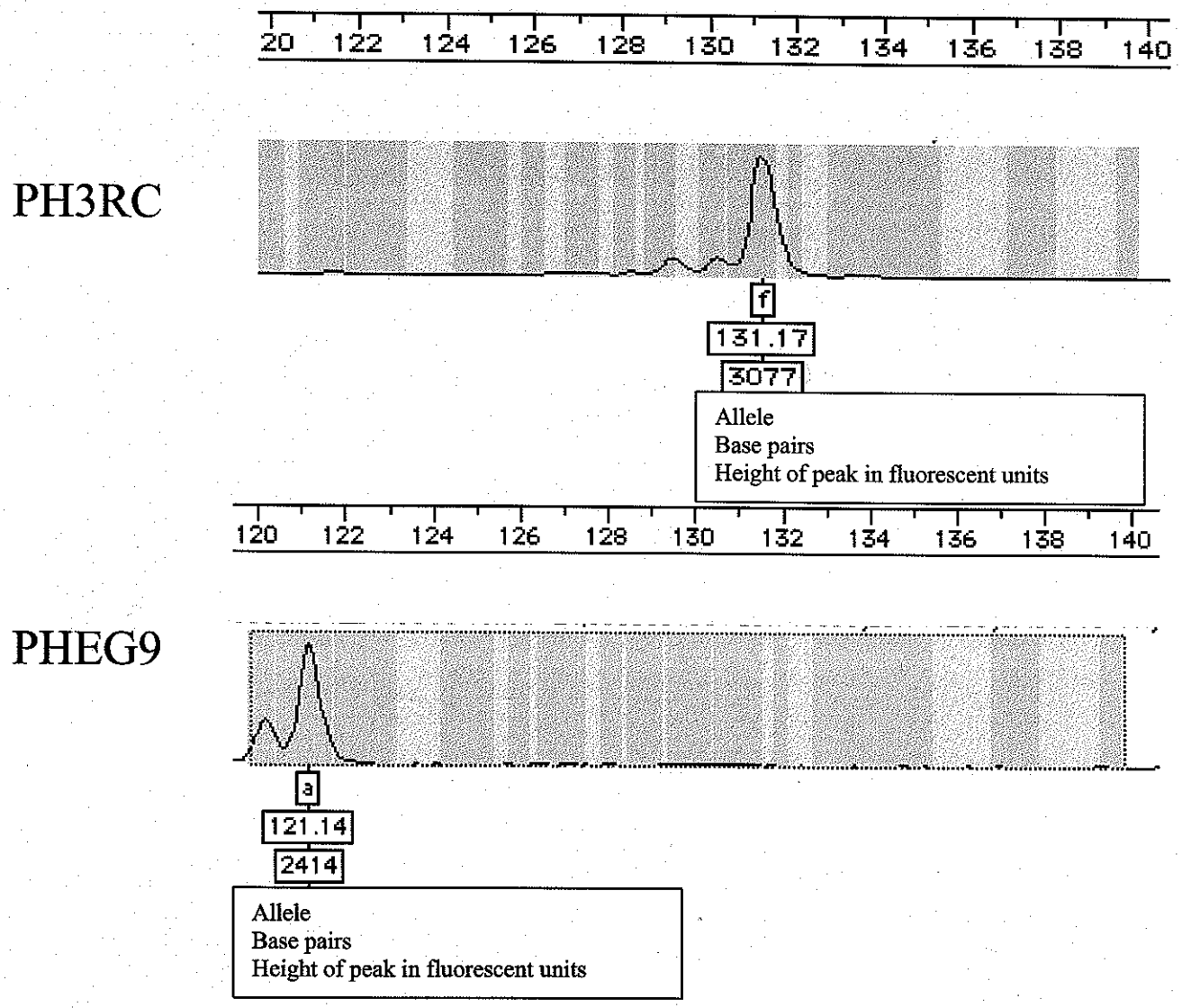

Figure 3. Electropherogram data for marker BNLG1951

Exhibit C
(Corn Maize)

United States Department of Agriculture, Agricultural Marketing Service
Science Division, Plant Variety Protection Office
National Agricultural Library Building, Room 500
Beltsville, MD 20705

Objective Description of Variety
Corn (Zea mays L.)

Name of Applicant (s)	Variety Seed Source	Variety Name or Temporary Designation
Pioneer Hi-Bred International, Inc.		PH3RC
Address (Street & No., or RFD No., City, State, Zip Code and Country		FOR OFFICIAL USE
7301 NW 62nd Avenue, P.O. Box 85, Johnston, Iowa 50131-0085		PVP0 Number 200200257

Place the appropriate number that describes the varietal characters typical of this inbred variety in the spaces below. Right justify whole numbers by adding Leading zeroes if necessary. Completeness should be striven for to establish an adequate variety description. Traits designated by an '*' are considered Necessary for an adequate variety description and must be completed.

COLOR CHOICES (Use in conjunction with Munsell color code to describe all color choices: describe #25 and #26 in Comments section):

01=Light Green	06=Pale Yellow	11=Pink	16=Pale Purple	21=Buff
02=Medium Green	07=Yellow	12=Light Red	17=Purple	22=Tan
03=Dark Green	08=Yellow Orange	13=Cherry Red	18=Colorless	23=Brown
04=Very Dark Green	09=Salmon	14=Red	19=White	24=Bronze
05=Green-Yellow	10=Pink-Orange	15=Red & White	20=White Capped	25=Variegated (Describe)
				26=Other (Describe)

STANDARD INBRED CHOICES
(Use the most similar (in background and maturity) of these to make comparisons based on **grow-out trial data**):

Yellow Dent Families:		Yellow Dent (Unrelated):	Sweet Corn:
Family	Members	Co109, ND246,	C13, Iowa5125, P39, 2132
B14	CM105, A632, B64, B68	Oh7, T232,	
B37	B37, B76, H84	W117, W153R,	Popcorn:
B73	N192, A679, B73, NC268	W18BN	SG1533, 4722, HP301, HP7211
C103	Mo17, Va102, Va35, A682		
Oh43	A619, MS71, H99, Va26	White Dent:	Pipecorn:
WF9	W64A, A554, A654, Pa91	C166, H105, Ky228	Mo15W, Mo16W, Mo24W

Groups on Lynx/Osborn/Grunst/98-99PVP

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EXHIBIT C: PH3RC

	Application Variety Data	Standard Variety Name
1. TYPE: (describe intermediate types in Comments section):		
2	1=Sweet 2=Dent 3=Flint 4=Flour 5=Pop 6=Ornamental — Dent	B73
2. REGION WHERE DEVELOPED IN THE U.S.A.:		Standard Seed Source
5	1=Northwest 2=Northcentral 3=Northeast 4=Southeast 5=Southcentral 6=Southwest 7=Other	PI 550473
3. MATURITY (In Region of Best Adaptability; show Heat Unit formula in 'Comments' section)		
DAYS / HEAT UNITS		DAYS / HEAT UNITS
075 / 1,474.3	From emergence to 50% of plants in silk	075 / 1,451.2
075 / 1,460.2	From emergence to 50% of plants in pollen	074 / 1,432.8
004 / 0,097.0	From 10% to 90% pollen shed	003 / 0,069.8
	From 50% silk to optimum edible quality	
	From 50% silk to harvest at 25% moisture	

4. PLANT:		Standard Deviation	Sample Size	Standard Deviation	Sample Size
235.3	cm Plant Height (to tassel tip)	14.62	11	229.0 / 18.65	11
076.2	cm Ear Height (to base of top ear node)	12.18	11	095.2 / 11.92	11
015.3	cm Length of Top Ear Internode	01.60	11	015.5 / 01.78	11
0.0	Average Number of Tillers/plant	00.03	11	0.0 / 00.02	11
0.9	Average Number of Ears per Stalk	00.19	11	1.0 / 00.07	11
4	Anthocyanin of Brace Roots: 1=Absent 2=Faint 3=Moderate 4=Dark 5=Very Dark			4	

5. LEAF:		Standard Deviation	Sample Size	Standard Deviation	Sample Size
10.0	cm Width of Ear Node Leaf	00.99	11	09.5 / 00.52	11
82.2	cm Length of Ear Node Leaf	05.33	11	84.3 / 05.65	11
07	Number of leaves above top ear	00.76	11	06 / 00.82	11
22	Degrees Leaf Angle (measure from 2nd leaf above ear at anthesis to stalk above leaf)	09.21	11	21 / 14.84	11
03	Leaf Color (Munsell code) — 5GY3/4			03 — 5GY3/4	
2	Leaf Sheath Pubescence (Rate on scale from 1=none to 9=like peach fuzz)			2	
	Marginal Waves (Rate on scale from 1=none to 9=many)				
	Longitudinal Creases (Rate on scale from 1=none to 9=many)				

6. TASSEL:		Standard Deviation	Sample Size	Standard Deviation	Sample Size
04	Number of Primary Lateral Branches	00.55	11	08 / 00.90	11
26	Branch Angle from Central Spike	08.41	11	17 / 06.64	11
60.4	cm Tassel Length (from top leaf collar node to tassel tip)	02.97	11	54.6 / 03.25	11
4	Pollen Shed (rate on scale from 0=male sterile to 9=heavy shed)			6	
11	Anther Color (Munsell code) — 2.5R5/8			07 — 5Y8.5/4	
14	Glume Color (Munsell code) — 10RP3/8			01 — 5GY5/6	
1	Bar Glumes (Glume Bands): 1=Absent 2=Present			1	

Application Variety Data PH3RC Page 2 Standard Variety Data

7a. EAR (Unhusked Data):

11	Silk Color (3 days after emergence) (Munsell code)	5R58	01	2.5GY84
01	Fresh Husk Color (25 days after 50% silking) (Munsell code)	2.5GY76	01	5GY78
21	Dry Husk Color (65 days after 50% silking) (Munsell code)	5Y92	21	2.5Y8.54
1	Position of Ear at Dry Husk Stage: 1= Upright 2= Horizontal 3= Pendant		2	
5	Husk Tightness (Rate of Scale from 1=very loose to 9=very tight)		7	
2	Husk Extension (at harvest): 1=Short (ears exposed) 2=Medium (<8 cm) 3=Long (8-10 cm beyond ear tip) 4=Very Long (>10 cm)		3	

7b. EAR (Husked Ear Data):

		Standard Deviation	Sample Size		Standard Deviation	Sample Size
17.5	cm Ear Length	01.37	11	13.5	01.13	11
42.6	mm Ear Diameter at mid-point	01.75	11	44.8	01.72	11
138.8	gm Ear Weight	30.57	11	112.8	18.10	11
15	Number of Kernel Rows	00.92	11	17.7	00.90	11
2	Kernel Rows: 1=Indistinct 2=Distinct			2		
2	Row Alignment: 1=Straight 2=Slightly Curved 3=Spiral			2		
08.2	cm Shank Length	01.25	11	08.9	02.07	11
2	Ear Taper: 1=Slight 2= Average 3=Extreme			2		

8. KERNEL (Dried)

		Standard Deviation	Sample Size		Standard Deviation	Sample Size
10.9	mm Kernel Length	00.70	11	11.0	00.45	11
08.1	mm Kernel Width	00.30	11	07.3	00.47	11
04.9	mm Kernel Thickness	00.54	11	04.2	00.60	11
58.0	% Round Kernels (Shape Grade)	17.33	11	45.2	26.33	11
1	Aleurone Color Pattern: 1-Homozygous 2=Segregating			1		
07	Aluerone Color (Munsell code)	1.25Y7/12		07	2.5Y8/12	
07	Hard Endosperm Color (Munsell code)	~~1.25Y8/12~~ 1.25Y 8/12		07	~~1.25Y8/14~~ 1.25Y 8/14	
03	Endosperm Type: 1=Sweet (Su1) 2=Extra Sweet (sh2) 3=Normal Starch 4=High Amylose Starch 5=Waxy Starch 6=High Protein 7=High Lysine 8=Super Sweet (se) 9=High Oil 10=Other_			3		
30.6	gm Weight per 100 Kernels (unsized sample)	03.41	11	23.91	03.56	11

9. COB:

		Standard Deviation	Sample Size		Standard Deviation	Sample Size
24.5	mm Cob Diameter at mid-point	00.82	11	27.6	01.03	11
14	Cob Color (Munsell code) 10R56			14	10R66	

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10. DISEASE RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); leave blank if not tested; leave Race or Strain Options blank if polygenic):

	A. Leaf Blights, Wilts, and Local Infection Diseases	
	Anthracnose Leaf Blight (Colletotrichum graminicola)	
5	Common Rust (Puccinia sorghi)	4
	Common Smut (Ustilago maydis)	
	Eyespot (Kabatiella zeae)	
	Goss's Wilt (Clavibacter michiganense spp. nebraskense)	
5	Gray Leaf Spot (Cercospora zeae-maydis)	3
	Helminthosporium Leaf Spot (Bipolaris zeicola) Race ———	
5	Northern Leaf Blight (Exserohilum turcicum) Race ———	2
7	Southern Leaf Blight (Bipolaris maydis) Race ———	3
	Southern Rust (Puccinia polysora)	
4	Stewart's Wilt (Erwinia stewartii)	3
	Other (Specify) ———	
	B. Systemic Diseases	
	Corn Lethal Necrosis (MCMV and MDMV)	
9	Head Smut (Sphacelotheca reiliana)	9
	Maize Chlorotic Dwarf Virus (MDV)	
	Maize Chlorotic Mottle Virus (MCMV)	
3	Maize Dwarf Mosaic Virus (MDMV)	3
	Sorghum Downy Mildew of Corn (Peronosclerospora sorghi)	
	Other (Specify) ———	
	C. Stalk Rots	
3	Anthracnose Stalk Rot (Colletotrichum graminicola)	3
	Diplodia Stalk Rot (Stenocarpella maydis)	
	Fusarium Stalk Rot (Fusarium moniliforme)	
	Gibberella Stalk Rot (Gibberella zeae)	
	Other (Specify) ———	
	D. Ear and Kernel Rots	
	Aspergillus Ear and Kernel Rot (Aspergillus flavus)	
8	Diplodia Ear Rot (Stenocarpella maydis)	6
5	Fusarium Ear and Kernel Rot (Fusarium moniliforme)	7
9	Gibberella Ear Rot (Gibberella zeae)	9
	Other (Specify) ———	

11. INSECT RESISTANCE (Rate from 1 (most susceptible) to 9 (most resistant); (leave blank if not tested) :

Banks grass Mite (Oligonychus pratensis)	
Corn Worm (Helicoverpa zea)	
Leaf Feeding	
Silk Feeding	
mg larval wt.	
Ear Damage	
Corn Leaf Aphid (Rhopalosiphum maidis)	
Corn Sap Beetle (Carpophilus dimidiatus)	
European Corn Borer (Ostrinia nubilalis)	
1st Generation (Typically Whorl Leaf Feeding)	
2nd Generation (Typically Leaf Sheath-Collar Feeding)	
Stalk Tunneling	
cm tunneled/plant	
Fall Armyworm (Spodoptera fruqiperda)	
Leaf Feeding	
Silk Feeding	
mg larval wt.	
Maize Weevil (Sitophilus zeamaize	
Northern Rootworm (Diabrotica barberi)	
Southern Rootworm (Diabrotica undecimpunctata)	
Southwestern Corn Borer (Diatreaea grandiosella	
Leaf Feeding	
Stalk Tunneling	
cm tunneled/plant	
Two-spotted Spider Mite (Tetranychus urticae)	
Western Rootworm (Diabrotica virgifrea virgifea)	
Other (Specify) ———	

12. AGRONOMIC TRAITS:

5	Staygreen (at 65 days after anthesis) (Rate on a sale from 1=worst to excellent)	3
0.0	% Dropped Ears (at 65 days after anthesis)	0.0
	% Pre-anthesis Brittle Snapping	
	% Pre-anthesis Root Lodging	
0.0	Post-anthesis Root Lodging (at 65 days after anthesis)	0.0
5,768.7	Kg/ha Yield of Inbred Per Se (at 12-13% grainmoisture)	5,460.3

13. MOLECULAR MARKERS: (0=data unavailable; 1=data available but not supplied; 2=data supplied):

1 Isozymes 0 RFLP's 0 RAPD's

COMMENTS (eg. state how heat units were calculated, standard inbred seed source, and/or where data was collected. Continue in Exhibit D):

CLARIFICATION OF DATA IN EXHIBITS B AND C

Please note the data presented in Exhibit B and C, "Objective Description of Variety," are collected primarily at Johnston, Ankeny, and Dallas Center, Iowa. The data in Tables 1A and 1B are from two sample t-tests using data collected in Johnston, Ankeny and Dallas Center, IA. These traits in exhibit B collectively show distinct differences between the two varieties.

The data collected in exhibit C was collected in 1997, 1999, 2000 and 2001 for page 1 and 2. There were 3 different planting dates planted for these trials. There are environmental factors that differ from year to year and from planting date to planting date. Environmental temperature and precipitation differences during the vegetative and grain fill periods can impact plant and grain traits, and are a source of variability. The environmental conditions described above could result in larger standard deviations. The variation associated with environment to environment is normally higher than the variation associated within locations. Also, the ear and sizing traits can vary depending on how well pollinated the ears are and how consistent the weather is during the grain fill period. I have enclosed a table that shows monthly temperature and precipitation in 1997, 1999, 2000, and 2001.

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Exhibit C. Temperature and Precipitation differences from Ankeny, IA

TEMPERATURE

YEAR	MAY	JUN	JULY	AUG	AVERAGE
1994	59.8	70.7	71.9	69.0	**67.9**
1995	56.2	69.4	74.3	76.9	**69.2**
1996	56.2	69.3	71.3	70.5	**66.8**
1997	53.5	70.6	74.1	69.6	**67.0**
1998	64.7	66.6	74.8	73.5	**69.9**
1999	60.7	69.7	78.7	70.5	**69.9**
2000	63.5	68.9	73.2	74.2	**70.0**
2001	61.3	69.0	76.7	74.2	**70.3**
2002	57.7	73.5	77.9	71.7	**70.2**

RAINFALL

YEAR	MAY	JUN	JULY	AUG	Total
1994	3.67	5.75	1.71	4.18	**15.31**
1995	5.04	4.19	2.94	2.87	**15.04**
1996	8.47	4.35	2.51	2.14	**17.47**
1997	4.32	3.27	4.10	1.36	**13.05**
1998	6.46	11.07	5.70	4.96	**28.19**
1999	6.46	4.54	4.45	6.55	**21.85**
2000	5.40	5.80	3.16	1.78	**16.14**
2001	5.72	3.87	2.05	1.92	**13.56**
2002	2.91	2.78	5.34	4.00	**15.03**

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U. S. C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)

PIONEER HI-BRED INTERNATIONAL, INC.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER

3. VARIETY NAME

PH3RC

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*

7301 NW 62nd AVENUE
P.O.BOX 85
JOHNSTON, IA 50131-0085

5. TELEPHONE *(include area code)*

515-270-4051

6. FAX *(include area code)*

515-253-2125

7. PVPO NUMBER

200200257

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* ***If no, please explain:*** ☒ YES ☐ NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company? ☒ YES ☐ NO

If no, give name of country

10. Is the applicant the original owner? ☒ YES ☐ NO ***If no, please answer one of the following:***

a. If original rights to variety were owned by individual(s), is(are) the original owner(s) a U.S. national(s)?

☐ YES ☐ NO ***if no, give name of country***

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

☒ YES ☐ NO ***If no, give name of country***

11. Additional explanation on ownership *(if needed, use reverse for extra space)*:

PH3RC is owned by Pioneer Hi-Bred International, Inc.

Pioneer Hi-Bred International, Inc. (PHI), Des Moines, Iowa, and/or its wholly owned subsidiary Pioneer Overseas Corporation (POC), Des Moines, Iowa, is the employer of the plant breeders involved in the selection and development of PH3RC. Pioneer Hi-Bred International and/or Pioneer Overseas Corporation has the sole rights and ownership of PH3RC pursuant to written contracts that assign all rights in the variety to PHI and/or POC at the time such variety was created. No rights to this variety are retained by any individuals.

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PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country Which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See section 41(a)(2) of the Plant Variety Protection Act for definition.